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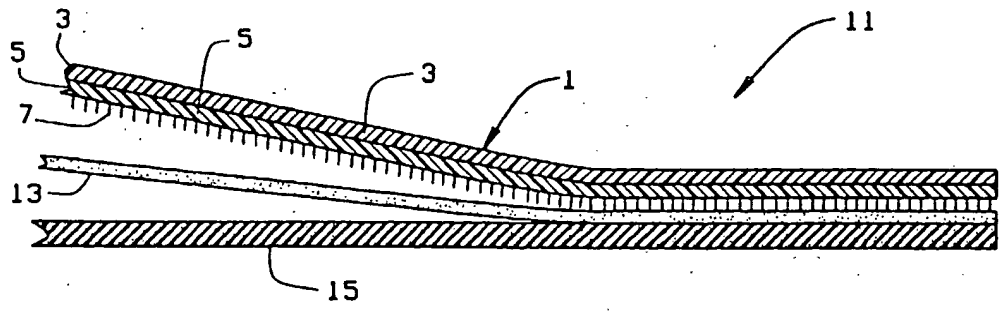
(54) Title: FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE APPLICATION OF THE TRANSFER BY THERMOPLASTIC POLYMER FILM



(57) Abstract: A flocked transfer (1) is produced by applying a release agent to a release sheet, and then applying the flocking (15) to a release agent. Unlike the traditional method, a binder and thermoplastic hot melt film is applied to the back of the flock. The transfer (1), which is essentially release sheet, is then applied to a substrate (15), such as item of clothing, a rubber pad, etc., by positioning a sheet of thermoplastic hot melt film (13) on the substrate (15); placing the transfer on the hot melt with the flock in contact with the hot melt film; and applying heat and pressure. The heat melts the thermoplastic hot melt film to bind the flock to the substrate and binds the flocking together. This method reduces the cost involved in producing flocked articles, especially for articles produced on a continuous basis.

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FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE APPLICATION OF THE TRANSFER BY THERMOPLASTIC POLYMER FILM

Technical Field

This invention relates to flocked transfers, and, in particular to an improved method incorporating thermoplastic polymer film, in the making of the flocked transfer, which can reduce the cost and time required of producing transfers by a significant amount.

Background Art

Heretofore, flocked transfers have generally been produced by applying a release agent to a release sheet. The flocking is applied to the release sheet in the desired pattern. A binder and a permanent hot melt adhesive are applied to the back of the flocking, and the transfer is allowed to dry. The binder is required to hold the flocking in the desired pattern. The hot melt adhesive, which is applied to the transfer as a powder, is used to adhere the transfer to a substrate, such as an article of clothing, a rubber pad, etc. The transfer is applied to the substrate by placing the transfer on the substrate with the dried hot melt adhesive in contact with the substrate. Heat, such as from an iron, is then applied to the release sheet. The heat melts the hot melt adhesive, to cause hot melt adhesive to flow into intimate contact with the substrate, forming a mechanical or physical adhesion with the substrate. The release agent then allows the release sheet to be removed from the transfer, leaving the flocking exposed on the substrate.

This traditional method has worked well for years. However, the method can be improved upon to reduce the cost of producing the transfer, and hence, the cost of the item containing the transfer.

In my co-pending application, I have described the usage of a thermoset film in lieu of the bond and powder for adhesion, which film, when subject to heat, adheres to the substrate, functions as an inherence for the flock. This current invention adds further enhancements to this process, by allowing the

operation, or where the heat transfer is produced. The thermoplastic film can be brought into the process at either stage, with respect to the manufacture of the transfer. It is most practical to combine the hot melt film before the heat transfer is fabricated, so it is combined in a convenient and portable manner, which operation was not possible with the previous type of application, for the thermoset film, because once the thermoset film was heated, it sets, and cannot be reheated.

In addition, it is possible to use a two-part thermoplastic type of film, such as commonly available in the industry, having different properties on each side in terms of, for example, melting point, and viscosity of structure. In this way, one can use a higher melting point hot melt film, of thermoplastic material, on the side that attaches to the flock fibers, so that the transfer is initially put together with higher heat in order to set the fibers in place, and then subsequently during application of the transfer to a textile, it may be done at a lower temperature to activate the hot melt on the substrate side while not hot enough to remelt the film holding the flock in place. Also, the hot melt holding the flock can be a very high viscosity, that is, it will not flow much when melted, in order to keep the fibers in place and not mat them together, while the film on the substrate side could be a lower viscosity type of film, that will readily flow so it will penetrate and establish a good mechanical adhesion of the transfer or grid to any substrate upon which the transfer is applied.

Thus, it is an object of this invention to provide for the development of a flock, that may be temporarily adhered onto a release film carrier, fabricated of a thermoplastic film. And, it is a further object that the hot melt film may be used as an intermediate layer, to attach the fibers to the substrate, when developing the transfer initially.

activates the hot melt adhesive to adhere the transfer to the substrate. This process is described in my prior patent, U.S. patent No. 4,810,549, as well as in my co-pending application, Serial No. 09/548,839, filed April 13, 2000, both of which are incorporated herein by reference.

In addition, I have described a similar transfer to that of this current invention, utilizing a thermosetting film, in my application having Serial No. 09/621,830, filed on July 24, 2000. The contents of that application are incorporated herein by reference.

A flocked transfer 1 of the present invention is shown in Fig. 2. The transfer 1 of the present invention includes a release sheet 3, to which a conventional release agent 5, such as a wax, or other binder, has been applied. The release agent is applied to the sheet in the shape of a pattern of the flocking. Flocking 7 is then applied to the release agent, and hence, to the release sheet, to form the transfer. The flocking 7 is applied, for example, in the manner as described in my previous patent and applications, which are incorporated herein by reference. Unlike the prior art processes, the transfer 1 is made without the use of a binder adhesive or hot melt adhesive. As is discussed below, a thermoplastic film is used to adhere the transfer to a substrate.

An article of manufacture, such as an item of clothing having a transfer 1 applied thereto, or a mouse pad, coaster, or any other numerous items having a flocked surface, can be manufactured in accordance with this invention. Is easily produced using the transfer 1. The article of manufacture 11 is produced by positioning a hot melt sheet 13, between a substrate 15 and the flocked release sheet. The hot melt sheet is, for example, a sheet of thermoplastic polymer, comprising polyesters, and which is available from Bostik. The hot melt sheet can also be made from a thermoplastic polyurethane. Any other thermoplastic film should also work well. The substrate 15 can be item of clothing, a rubber pad (as for example, for producing a mouse pad or coaster), etc. The hot melt sheet can be precut to correspond to the shape of the transfer. The transfer 1 is then positioned on the hot melt sheet with the flock 5 against

clothing, subjecting the transfer to those elevated temperatures, again, will allow the flock to be removed, if that is a need of the owner.

Articles, such as mouse pads or coasters, in which the entire top surface of the article is covered with the flocking can be produced on a continuous basis, as shown in Fig. 5. Rolls 21, 23 and 25, of the flocked release sheet 1, the thermoplastic hot melt film 13, and the substrate 15, are provided. The three parts are brought together at a lamination station 33. Rollers can be provided in front of the station 33 so that the three elements are adjacent each other as they enter the lamination station. In the lamination station, heat and pressure are applied to the three sheets (the flocked release sheet, the hot melt film, and the substrate) to melt the hot melt film. The melted hot melt film will then cure or cross-link, as noted above, to adhere the flock to the substrate. A web 35 exits the laminating station. The web 35 is then allowed to cool. The web 35 is ultimately directed to a cutting station where it is cut into individual articles. Once the web 35 is cooled, it can be directed immediately to a cutting station (after the sheet 35 cools), or it can be wound up on an uptake roller to be cut into individual articles at a later time, or at a different location. At the cutting station, the release sheet is removed from the flock and gathered on a take-up roll or is otherwise disposed of. After the release sheet has been removed from the flock, the substrate with flock adhered thereto is cut to form the articles 11. It is also likely that one could remove the release liner either before or after the die cutting procedure.

Preferably the release sheet is flocked and supplied in roll form as shown in Fig. 5. However, the flocking of the release sheet could be made part of the process.

To produce flocked articles, such as shirts, jackets, sports bags, etc., which cannot be easily flocked on a continuous basis, the hot melt sheet can be applied to the transfer 1 prior to applying the transfer to the substrate. To do this, the thermoplastic hot melt film is placed in contact with the flock of the transfer, and the transfer and release sheet are heated to a temperature at which

or EVA film will slightly soften, or melt, to function as an adhesive, for application of the entire transfer to its supporting substrate or surface. This is an example as to how the thermoplastic film(s) of this invention can be used not only for constructing of the transfer, but to function in a dual manner to allow for the application of the transfer to a shirt, bag, or other material, during its final application.

Another one of the advantages of utilization of thermoplastics, in the fabrication of flocked transfers, is that the binder adhesives previously used in the flocking process, typically contain an acrylic, or other materials, which may be flammable. Thermoplastics avoid that predicament. Furthermore, the thermoplastic type binder exhibits wash fastness, and will hold the flock in place even during severe washing conditions. Furthermore, thermoplastic films exhibit better elasticity, than can be obtained from the thermoset or other binder hot melt systems now in use. In addition, the use of the film provides a thinner profile for the finished product, providing a less bulky type of flock transfer, both visually and structural wise, when applied to a garment or other textiles. For example, flock transfers made in accordance with this invention can even be used upon sheer garment textiles. The usage of the thermoplastic film of this invention, avoids the necessity for application of binders, as previously used, and which contain formaldehyde or other undesirable chemicals, as used in previous adhesives to achieve cross linking for flocking purposes in the prior art. There are other miscellaneous film properties that are enhanced through the usage of thermoplastic films, versus the usage of the binder-hot melt powder combination, because there are films that have performance characteristics that cannot be obtained nor are they available for the binder-powder systems. For example, adhesions to leather, or other tough-to-stick-to-surfaces, that exhibit greater tensile strength, such as stretching that will not split, can be better accommodated through the usage of thermoplastic film.

Variations or modifications to the subject matter of this invention may occur to those skilled in the art upon reviewing the invention as described

Claims:

1. A flocked transfer consisting essentially of a release sheet, a release agent on the release sheet, and flock on the release agent; the flock being formed in a desired pattern; the release agent holding the flock to the release sheet, the transfer is adhered to a substrate, the substrate is applied using a thermoplastic hot melt sheet.

2. The article of claim 1 wherein the thermoplastic film is a thermoplastic blank or thermoplastic blank film.

3. A method of producing an article of manufacture having a flocked surface, the method comprising:

supplying a flocked release sheet comprising a release sheet with flock adhered thereto;

adhering a thermoplastic hot melt film to the flock of the flocked release sheet; and

adhering the thermoplastic hot melt film to a substrate to adhere the flock to the substrate.

4. The method of claim 3 wherein the step of adhering the thermoplastic hot melt film to the flocked release sheet comprises heating the thermoplastic hot melt film to a temperature at which the hot melt film becomes tacky, but below a temperature at which the hot melt film begins to cure or physically adhere.

5. The method of claim 3 wherein the step of adhering the thermoplastic hot melt to the substrate comprises heating the hot melt film to temperature at which the hot melt film cures and cross -links.

6. The method of claim 5 wherein the hot melt film is heated to about 300°F.

7. The method of claim 3 wherein the step of adhering the thermoplastic hot melt film to the flocked release sheet and the step of adhering the thermoplastic hot melt film to the substrate are performed in substantially simultaneously in a single operation.

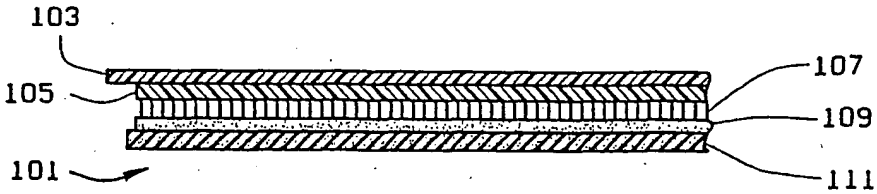

FIG. 1
PRIOR ART

FIG. 2

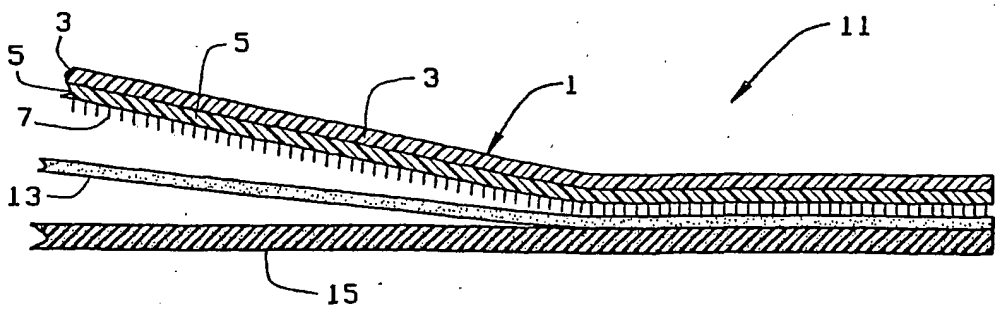

FIG. 4

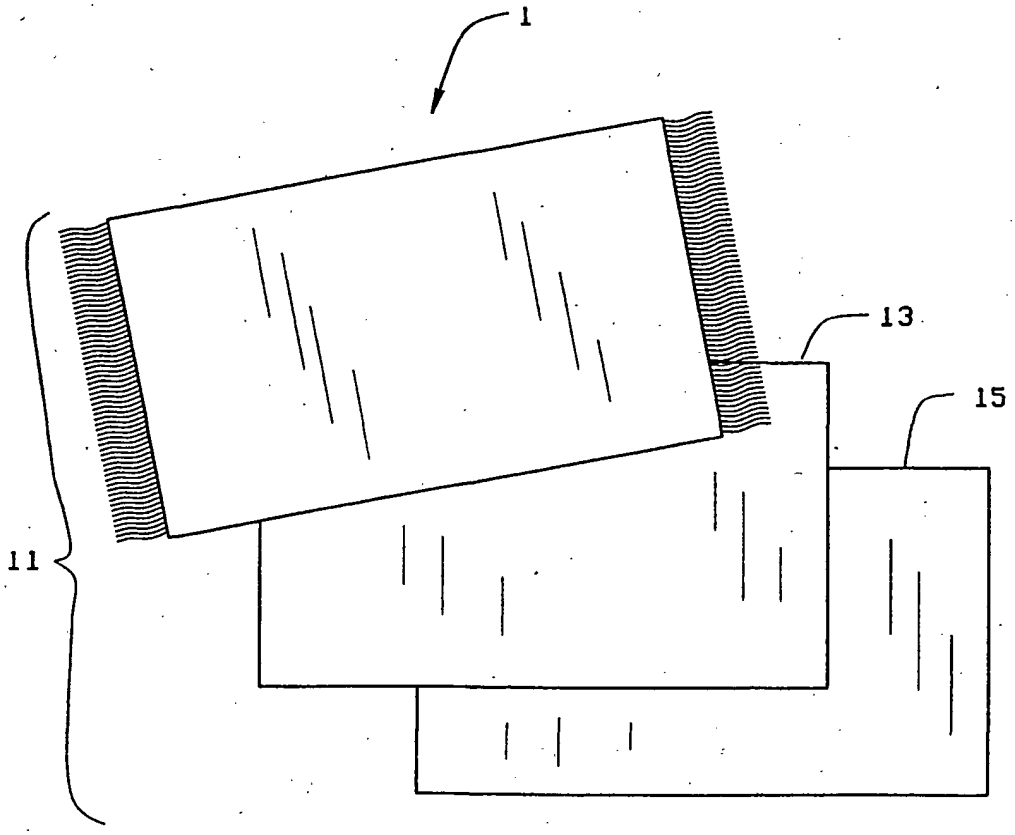

FIG. 3

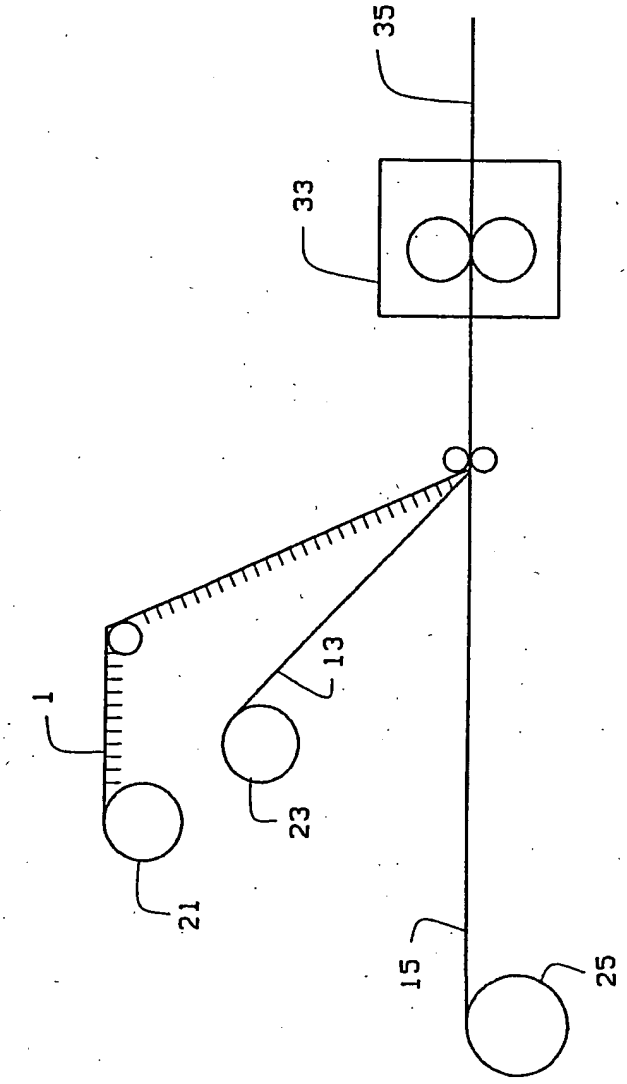

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/48615

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B05D 1/14.
US CL :428/90,94,914,41.8.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 428/90,94,914,41.8.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
PALM

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,010,764 A (ABRAMS) 04 JANUARY 2000, SEE ENTIRE DOCUMENT.	1-15

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

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